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REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

Specification

The Office Action objected to the disclosure because the timer queue identified by reference character 31 on page 10, line 28 was identified by the reference number 30 in the drawings. Page 10, line 28 is corrected so that the reference character "31" now reads --30--. The objection is traversed.

The Office Action further objected to the disclosure because "the unlock process removes the lock flag" was identified by reference character "115" whereas the step was identified in the drawings using the reference character "116". Page 19, line 1 of the disclosure is corrected so that the former reference character "115" now reads --116--, and the objection is traversed.

Drawings

The Office Action objected to the drawings because the reference character "68" was used to identify 2 items in Fig. 5d. Fig. 5d is amended to correctly identify the "the Process Pending Call Lock" using reference number "66". The objection is traversed. A replacement drawing sheet as well as a drawing sheet showing the change made is attached hereto in Appendix A.

Claim Rejections 35 U.S.C. § 102

The Office Action rejected claims 1 and 21 under 35 U.S.C. 102(b) as being anticipated by Lotito et al. in United States Patent No. 4,625,081. Applicant respectfully disagrees.

It is established law that in order to anticipate, a reference must teach each and every feature of the claimed invention. Claim 1 claims a method of managing execution time in a shared memory parallel processor computing environment. Lotito teaches a system 100 consisting of from 8 to 32 processors,

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together with a range of controllers, peripherals and storage modules. Each processor is a fully independent, high speed 16-bit machine having a non-micro-coded architecture and **high-speed memory** (emphasis added). Consequently, a person skilled in the art would understand that Lotito does not teach a shared memory parallel processor.

Claim 1 further claims defining a plurality of process classes and assigning each process to be executed to one of the process classes. Applicant concedes that Lotito teaches defining five process classes, numbered from 0 to 4. Processes assigned to class 4 have the highest priority; those assigned to class 0 have the lowest priority. Within each of the 5 classes, processes are ranked from 0 to 255, the highest rank being 255 (column 102, lines 54-59).

However, claim 1 also claims defining an execution time slice for each of the process classes. Lotito is completely silent on defining an execution time sliced for each of the process classes. Lotito states that a process is a program and associated set of dynamic data (that is, its context) provided execution time by REX. How the execution time is allocated to a process is not, however, described. It is clear that Lotito does not suggest or describe the assignment of an execution time slice for each of the process classes.

Claim 1 further claims permitting a process to be executed by one of the processors without interruption until the execution time slice associated with the process class has expired. In columns 103 and 104, Lotito teaches directly away from this limitation. For example, Lotito teaches in column 103, lines 4-7 that "after a process begins execution, various REX routines allows the process to dynamically alter its own priority or, subject to certain restrictions, that of another process. As explained above, priority is directly associated with class in accordance with Lotito. Consequently, altering the priority of a process is equivalent to

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changing the class of the process. As would be understood by any person skilled in the art, if Lotito's processes change their class or the class of others, then they cannot execute without interruption until the execution time slice associated with the process class has expired, because the time slice associated with the process would likewise be changed.

Lotito further teaches in column 103, lines 10-13 that "Once given control, a process is allowed to execute until it voluntarily relinquishes control **or is interrupted by the occurrence of a hardware interrupt.**" This likewise teaches directly away from the claimed invention since, as claimed in claim 1, a process is not interrupted until a time slice associated with its class has expired. Furthermore, as taught in column 103, lines 61-62 of Lotito, "Processes in one class are allowed to interrupt those in a lower class". Again, this teaches directly away from the invention claimed claim 1. As further taught in column 104, lines 3-8, "The servicing of a hardware interrupt can result in making dispatchable a process whose class is higher than the interrupted process. In this case, the interrupted process is suspended and the higher-class process given execution control". This likewise teaches directly away from the invention claimed in claim 1.

It is therefore respectfully submitted that the rejection of claim 1 under 35 U.S.C. 102 is unfounded and Applicant respectfully requests that it be withdrawn.

Claim 21 is claimed to a machine which performs the steps of the method of claim 1. The rejection of claim 21 is traversed for reasons set forth above.

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Claim Rejections 35 U.S.C. § 103

The Office Action rejected claims 2-8, 11, 12, 25-26 and 28-31 under 35 U.S.C. § 103(a) as being unpatentable over Lotito in view of Frank et al. in United States Patent No. 5,790,851.

As explained above in detail, Lotito teaches away from the invention claimed in claims 1 and 21.

Frank teaches a method of sequencing lock call requests to an operating system in order to avoid spin lock contention within a multi-processor environment. An arbitration procedure is used to allow processes and their associated processors to perform useful work while they have a pending service request for access to shared resources within a multi-processor system environment. The arbitration procedure is implemented within a multi-processor system in which multiple processes can simultaneously request locks that control access to shared resources such as access to resources that are globally synchronized among the many processes. Such locks are very familiar to those skilled in the art and commonly used for operations such as relational database updates.

Frank does not teach or suggest the calling of a lock procedure during execution to permit a process to continue to execute without interruption for a predetermine period of time after a time slice associated with the process class has expired. In fact, Frank fails to teach or suggest execution time slices associated with process classes or any method for permitting a process class to execute without interruption. It is therefore respectfully submitted that the resource lock described by Frank is irrelevant to the invention claimed in claims 2-8, 11, 12, 25, 26 and 28-31. The rejection of those claims is thereby traversed.

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The Office Action rejected claims 9, 10 and 27 under 35 U.S.C. 103(a) as being unpatentable over Lotito in view of Frank and further in view of Gans et al. in United States Patent No. 5,835,762.

As explained above, Lotito teaches away from the claimed invention and Frank is irrelevant to the claimed invention. Gans teaches a method and apparatus for processing electronic mail in parallel. Mail objects are processed in an electronic mail system by managing a plurality of messages in a queue. Although the electronic mail messages are processed in parallel, there is no mention of processing using a shared memory parallel processor. It is therefore respectfully submitted that there is no motivation for a person of ordinary skill in the art to combine the references. At any rate, for reasons set forth above in detail, no combination of Lotito, Frank and Gans yields the invention claimed in claims 9, 10 and 27 and the rejection of those claims is traversed.

The Office Action rejected claims 13, 14 and 22-24 as being unpatentable over Lotito in view of Elnozahy in United States Patent No. 6,421,701. Elnozahy teaches a method and system for replication support in a remote method invocation system. As taught in column 5, lines 38-46, Elnozahy teaches that his system implements deterministic and preemptive threads scheduling. Scheduler 31 allocates instructions slices on a CPU, where an instructions slice serves as a scheduling unit during which a thread executes a prespecified number of instructions, P, before it is preempted. Thus scheduling by "instruction slice" means scheduling a thread based upon a number of instructions executed and not based upon a time of execution or a number of execution cycles. This teaches directly away from the claimed invention and the rejection of claims 13, 14 and 22-24 is traversed.

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Claims 15-20 and 32-36 were rejected under 35 U.S.C. as being unpatentable over Lotito in view of Anderson.

As explained above, Lotito teaches away from the claimed invention.

Anderson teaches hardware-configured operating system kernel having a parallel-searchable event queue for a multitasking processor.

The Office Action admits that neither Lotito nor Anderson nor any combination of Lotito and Anderson teach organizing and maintaining a timer queue in a software environment which holds a process for a duration of time before moving the process forward for execution, scheduling addition of new processes to the timer queue, scheduling reordering the timer queue each time the change in its content occurs to ensure that access to computing resources is optimized.

It is established law that teachings of the invention cannot be used to establish a prima fascia case of obviousness. Both Anderson and Lotito are silent with respect to the invention claimed in claims 15-20 and 32-36 and the rejection is traversed.

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In view of the correction made to the specification and the drawings, and for reasons set forth above in detail, claims 1-36 pending in this application are considered to be in a condition for immediate allowance. Favourable reconsideration and early issuance of a Notice of Allowance are therefore requested.

Respectfully submitted,

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